WHAT IS CLAIMED IS:

1. A sample inspection system, comprising:
collection optics that receive radiation scattered from a point on a sample surface proximate a symmetry axis of said collection optics and originating from an incident radiation directed at an oblique angle with respect to said sample surface, said collection optics being further configured to direct the scattered radiation to a detector
a spatial filter disposed between said collection optics and the detector,
said spatial filter being configured to screen the detector from substantially all of the scattered radiation that is scattered in a direction having a forward azimuthal component relative to the incident radiation,
said spatial filter or system being configured to screen the detector from the scattered radiation scattered in a direction having a backward azimuthal component relative to the incident radiation and an elevation angle less than about 45° with respect to a normal to the surface
whereby the detector is screened from forward scattered noise while a backscattered signal is allowed to reach the detector.

2. The system of claim 1 wherein said spatial filter includes an opaque material having an opening in the shape of a single wedge.

3. The system of claim 2 wherein said wedge has a symmetry axis aligned with a direction of incidence of said incident radiation.

4. The system of claim 2 wherein said wedge is substantially semicircular.

5. The system of claim 1 wherein the spatial filter transmits to the detector the scattered radiation that is scattered in a direction having a backward azimuthal component relative to the incident radiation and an elevation angle greater than about 45° with respect to a normal to the sample surface.

6. The system of claim 1 wherein said collection optics collects said scattered radiation scattered at elevation angles between about 25° and about 75° with respect to said normal and directs the collected scattered radiation toward the detector.

7. The system of claim 1 wherein said spatial filter and/or system is configured to screen the detector from said scattered radiation scattered in a direction having a backward azimuthal component relative to said incident radiation and an elevation angle less than about 45° with respect to a normal to said surface.

8. The system of claim 7 wherein the spatial filter transmits to the detector the scattered radiation that is scattered in a direction having a backward azimuthal component relative to the incident radiation and an elevation angle greater than about 55° with respect to a normal to the sample surface.

9. The system of claim 1 wherein said spatial filter includes an opaque portion that blocks undesired backscattered radiation.

10. The system of claim 1 wherein the spatial filter includes an opaque portion.

11. The system of claim 10 wherein the opaque portion is adjustable.

12. The system of claim 10 wherein the opaque portion includes an opening.

13. The system of claim 12 opening is adjustable.

14. The system of claim 1 wherein the distance between the spatial filter and the sample surface is adjustable.

15. The system of claim 1 wherein said spatial filter includes a variable optical material having a plurality of pixels, each pixel being selectively configurable in either a first state or a second state, the pixel being substantially opaque in the first state and substantially radiation-transmitting in the second state.

16. The system of claim 15, further comprising a controller coupled to the spatial filter.

17. The system of claim 16, further comprising an imaging device coupled to the controller.

18. The system of claim 17 wherein the imaging device receives radiation scattered from the sample surface.

19. The system of claim 18 wherein the imaging device produces an image wherein a signal from defects on the surface is distinguishable from a background noise due to surface roughness.

20. A spatial filter for a sample inspection system of the type having collection optics including a curved mirrored surface that receives radiation scattered from a point on a sample surface proximate a symmetry axis of the curved reflecting surface and direct the scattered radiation toward a detector, said spatial filter comprising:
an opaque portion;
said opaque portion being configured such that when the spatial filter is disposed between the collection optics and the detector, said opaque portion screens the detector from substantially all of the scattered radiation that is scattered in a direction having a forward azimuthal component relative to an incident radiation,
said portion being sized and shaped such that when the spatial filter is disposed between the collection optics and the detector the opaque portion screen the detector from the scattered radiation scattered in a direction having a backward azimuthal component relative to the incident radiation and an elevation angle less than about 45° with respect to a normal to the sample surface,
whereby said opaque portion screens the detector from forward scattered noise while the opening allows a backscattered signal to reach the detector.

21. The spatial filter of claim 20 wherein the opaque portion includes an opening.

22. The spatial filter of claim 21 wherein the opening is in the shape of a single wedge.

23. The spatial filter of claim 22 wherein said wedge has a symmetry axis aligned with a direction of incidence of said incident radiation.

24. The spatial filter of claim 23 wherein said wedge is substantially semicircular.

25. The spatial filter of claim 21 wherein the opaque portion and opening are configured such that when the spatial filter is disposed between the collection optics and the detector the opaque portion screens the detector from said scattered radiation scattered in a direction having a backward azimuthal component relative to said incident radiation and an elevation angle less than about 45° with respect to a normal to said surface.

26. The spatial filter of claim 21 wherein the opening is sized and shaped said opening being sized and shaped such that when the spatial filter is disposed between the collection optics and the detector the opening transmits to the detector the scattered radiation that is scattered in a direction having a backward azimuthal component relative to the incident radiation and an elevation angle greater than about 45° with respect to a normal to the sample surface.

27. The spatial filter of claim 21 wherein the opening is sized and shaped said opening being sized and shaped such that when the spatial filter is disposed between the collection optics and the detector the opening transmits to the detector the scattered radiation that is scattered in a direction having a backward azimuthal component relative to the incident radiation and an elevation angle greater than about 55° with respect to a normal to the sample surface.

28. The spatial filter of claim 21 wherein the configuration of the opening and/or opaque portion is adjustable.

29. The spatial filter of claim 20 wherein the configuration of the opaque portion is adjustable.

30. The spatial filter of claim 20 wherein the spatial filter includes a variable optical material having a plurality of pixels, each pixel being selectively configurable in either a first state or a second state, the pixel being substantially opaque in the first state and substantially radiation-transmitting in the second state.

31. The spatial filter of claim 30 further comprising a controller coupled to the plurality of pixels, the controller being configured to provide one or more signals that determine whether a given pixel is in the first state or the second state.

32. In a sample inspection system of the type having collection optics including a collection optics that receive radiation scattered from a point on a sample surface proximate a symmetry axis of the collection optics and direct the scattered radiation toward a detector, a method for enhancing a signal to noise ratio, the method comprising the steps of:
screening the detector from substantially all of the scattered radiation that is scattered in a direction having a forward azimuthal component relative to an incident radiation; and

screening the detector from the scattered radiation that is scattered in a direction having a backward azimuthal component relative to an incident radiation and an elevation angle less than about 45° with respect to a normal to the surface,
whereby forward scattered noise is screened from the detector while backscattered signal reaches the detector.

33. The method of claim 32 further comprising transmitting to the detector the scattered radiation that is scattered in a direction having a backward azimuthal component relative to the incident radiation and an elevation angle greater than about 45° with respect to a normal to the sample surface.

34. The method of claim 32 further comprising transmitting to the detector the scattered radiation that is scattered in a direction having a backward azimuthal component relative to the incident radiation and an elevation angle greater than about 55° with respect to a normal to the sample surface.

35. The method of claim 32 wherein the incident radiation is incident on the surface at a Brewster angle with respect to the surface.

36. In a sample inspection system of the type having collection optics including a collection optics that receive radiation scattered from a point on a sample surface proximate a symmetry axis of the collection optics and direct the scattered radiation toward a detector, a method for enhancing a signal to noise ratio, the method comprising the steps of:
collecting part of the scattered radiation with an imaging device;
generating an image of the scattered radiation wherein a signal from defects on the surface is distinguishable from a background noise due to surface roughness; and
in response to the image, selectively screening the detector from portions of the scattered radiation corresponding to the background noise.

37. The method of claim 36 wherein selectively screening the detector includes the use of a programmable spatial filter including a variable optical material having a plurality of pixels, each pixel being selectively configurable in either a first state or a second state, the pixel being substantially opaque in the first state and substantially radiation-transmitting in the second state.

38. The method of claim 36 wherein the variable optical material is a liquid crystal display panel.